FIG.1

FIG.1B	FIG.1A

FIG.1A

CONTROL OF
A MOBILE STATION

TRANSMISSION

S1 — MEASURING RECEPTION SIR
OF A SPECTRUM SPREAD
SIGNAL TRANSMITTED
FROM A BASE STATION

DEMODULATING
A SPECTRUM SPREAD
SIGNAL TRANSMITTED
FROM A BASE STATION
— S11

S4 — SAMPLING OF
A TRANSMISSION POWER
CONTROL BIT

S2 — COMPARING RECEPTION SIR
AND TARGET SIR

CHECKING NUMBER OF FRAME
ERROR FOR A PLURALITY OF
FRAMES TO DETERMINE
FRAME ERROR RATE
— S12

S3 — SETTING A TRANSMISSION
POWER CONTROL BIT
BASED ON RESULT
OF COMPARISON

COMPARING MEASURED
FRAME ERROR RATE AND
TARGET FRAME ERROR RATE
— S13

S5 — CONTROLLING
TRANSMISSION POWER
BASED ON A TRANSMISSION
POWER CONTROL BIT

TRANSMISSION

CORRECTING (ALTERING)
TARGET SIR BASED ON THE
RESULT OF COMPARISON
— S14

RETURN

FIG.1B

CONTROL OF
A BASE STATION

TRANSMISSION

TRANSMISSION

S4

| MEASURING RECEPTION SIR OF A SPECTRUM SPREAD SIGNAL TRANSMITTED FROM A MOBILE STATION | DEMODULATING A SPECTRUM SPREAD SIGNAL TRANSMITTED FROM A MOBILE STATION | SAMPLING OF A TRANSMISSION POWER CONTROL BIT |

S1

S11

| COMPARING RECEPTION SIR AND TARGET SIR | CHECKING NUMBER OF FRAME ERROR FOR A PLURALITY OF FRAMES TO DETERMINE FRAME ERROR RATE | |

S2

S12

S5

| SETTING A TRANSMISSION POWER CONTROL BIT BASED ON RESULT OF COMPARISON | COMPARING MEASURED FRAME ERROR RATE AND TARGET FRAME ERROR RATE | CONTROLLING TRANSMISSION POWER BASED ON A TRANSMISSION POWER CONTROL BIT |

S3

S13

CORRECTING (ALTERING) TARGET SIR BASED ON THE RESULT OF COMPARISON

S14

RETURN
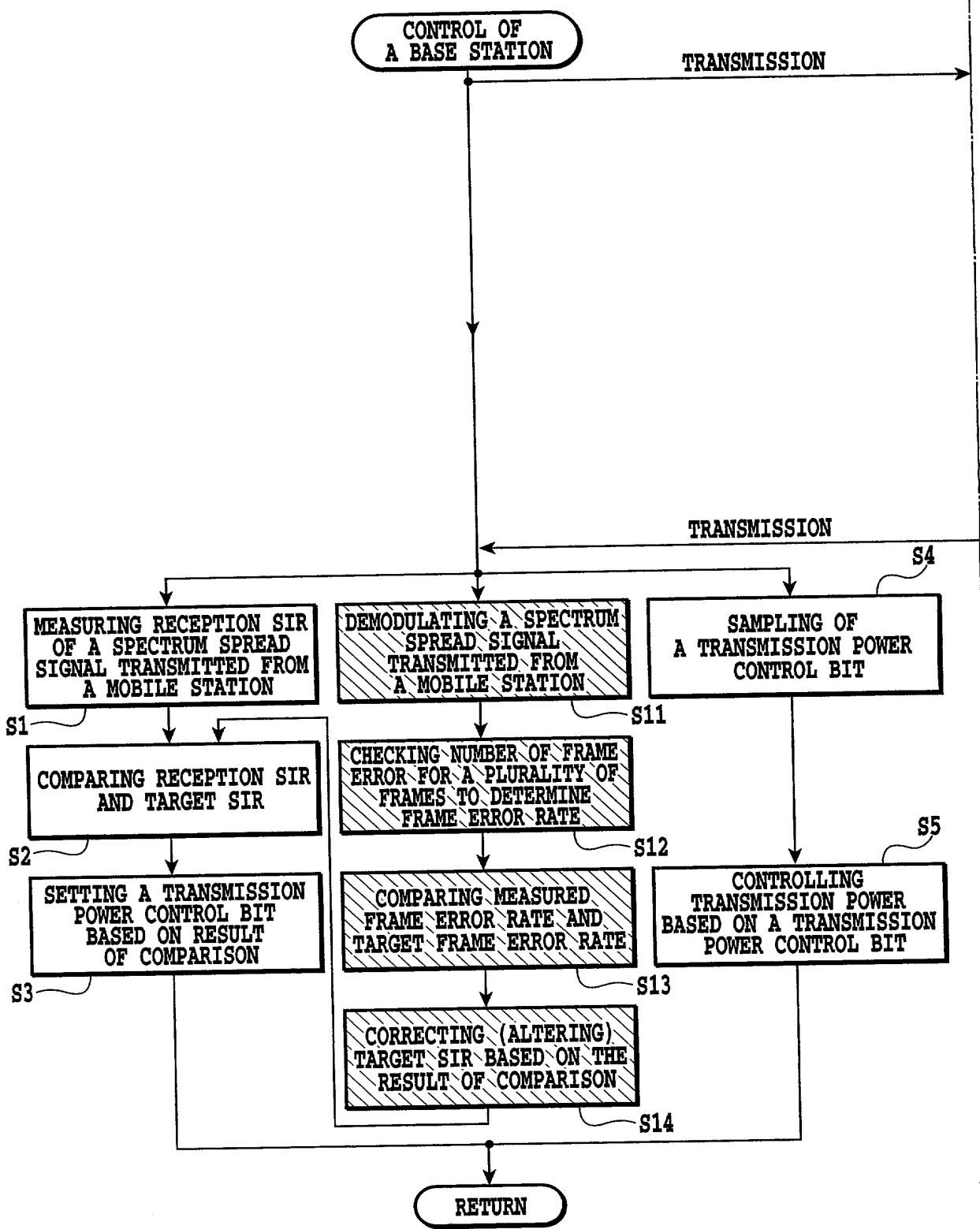
$$\left.\begin{array}{l} \text{MEASURED NUMBER OF FRAME} = N_{frame} \\ \text{MEASURED NUMBER OF FRAME ERROR} = N_{error} \end{array}\right\} \rightarrow \begin{array}{l} \text{MEASURED FRAME ERROR RATE} \\ = N_{error}/N_{frame} \end{array}$$

FIG.2A

MEASURED FRAME ERROR RATE = N_{error}/N_{frame}

(1) $N_{error} \geqq T_{error} \rightarrow$ TARGET SIR IS INCREASED BY Δ_{UP} (dB)
(2) $N_{error} < T_{error} \rightarrow$ TARGET SIR IS DECREASED BY Δ_{down} (dB)

FIG.2B

INCREASE BY Δ_{UP}

DECREASE BY Δ_{down}

N_{error}

T_{error}

FIG.2C

UPPER LIMIT TARGET FRAME ERROR RATE = $T_{error,u}/N_{frame}$
LOWER LIMIT TARGET FRAME ERROR RATE = $T_{error,d}/N_{frame}$
($T_{error,d} \leq T_{error,u}$)

(1) $T_{error} > T_{error,u}$ → TARGET SIR IS INCREASED BY Δ_{up} (dB)
(2) $T_{error,d} \leq N_{error} \leq T_{error,u}$ → TARGET SIR IS NOT ALTERED
(3) $N_{error} < T_{error,d}$ → TARGET SIR IS DECREASED BY Δ_{down} (dB)

FIG.3A

FIG.3B

FIG.4A

UPPER LIMIT TARGET FRAME ERROR RATE = $T_{error,u(1)}/N_{frame}$
LOWER LIMIT TARGET FRAME ERROR RATE = $T_{error,d(1)}/N_{frame}$

$(T_{error,d(1)} \leq T_{error,u(1)})$

SETTING THRESHOLD VALUES $T_{error,u(n)}$ $(2 \leq n \leq N)$, $T_{error,d(m)}$ $(2 \leq m \leq M)$
$(T_{error,d(M)} \leq T_{error,d(M-1)} \leq \cdots \leq T_{error,d(1)} \leq T_{error,u(1)} \leq T_{error,u(2)} \leq \cdots \leq T_{error,u(N)})$

(1) $N_{error} > T_{error,u(N)}$ → TARGET SIR IS INCREASED BY $\Delta_{up(N)}$ (dB)
(2) $T_{error,u(n+1)} \geq N_{error} > T_{error,u(n)}$ → TARGET SIR IS INCREASED BY $\Delta_{up(n)}$ (dB) (n = 1~N-1)
(3) $T_{error,d(1)} \leq N_{error} \leq T_{error,u(1)}$ → TARGET SIR IS NOT ALTERED
(4) $T_{error,d(m+1)} \leq N_{error} < T_{error,d(m)}$ → TARGET SIR IS DECREASED BY $\Delta_{down(m)}$ (dB) (m = 1~M-1)
(5) $N_{error} < T_{error,d(M)}$ → TARGET SIR IS DECREASED BY $\Delta_{down(M)}$ (dB)

FIG.4B

N_{error}	
$T_{error,u(N)}$, $T_{error,u(3)}$	INCREASE BY $\Delta_{up(N)}$
$T_{error,u(2)}$	INCREASE BY $\Delta_{up(2)}$
$T_{error,u(1)}$	INCREASE BY $\Delta_{up(1)}$
	+/− 0dB
$T_{error,d(1)}$	DECREASE BY $\Delta_{down(1)}$
$T_{error,d(2)}$	DECREASE BY $\Delta_{down(2)}$
$T_{error,d(3)}$, $T_{error,d(M)}$	DECREASE BY $\Delta_{down(M)}$

1 FRAME

10

20

#0 | #1 | #2 | ... | #15

1 SLOT

30 40 50

PILOT SECTION (4 UNITS)

TRANSMISSION POWER CONTROL (TPC) BIT

DATA SECTION (36 UNITS)

(FOR SYNCHRONOUS DETECTION AND MEASUREMENT OF SIR)

FIG.5

FIG.6

CONTROL OF A MOBILE STATION

CONTROL OF A MOBILE STATION SHOWN IN FIG.1

S1~S5,
S11~S14

TRANSMISSION

TRANSMISSION

RETURN

CONTROLLING A HIGHER-HIERARCHY STATION OF BASE STATIONS FROM OTHER BASE STATION

DIVERSITY SYNTHESIZATION OF DEMODULATED SIGNALS FROM VARIOUS BASE STATIONS — S21

FINDING NUMBER OF FRAME ERROR OF DEMODULATED SYNTHESIZED SIGNALS FOR A PLURALITY OF FRAMES TO DETERMINE FRAME ERROR RATE — S22

COMPARING MEASURED SYNTHESIZED FRAME ERROR RATE AND TARGET SYNTHESIZED FRAME ERROR RATE — S23

CORRECTING (ALTERING) TARGET FRAME ERROR RATE OF EACH BASE STATION BASED ON THE RESULT OF COMPARISON — S24

DEMODULATING A SPECTRUM SPREAD SIGNAL TRANSMITTED FROM A MOBILE STATION — S11

FINDING NUMBER OF FRAME ERRORS FOR A PLURALITY OF FRAMES TO DETERMINE FRAME ERROR RATE — S12

COMPARING MEASURED FRAME ERROR RATE AND TARGET FRAME ERROR RATE — S13

CORRECTING (ALTERING) TARGET SIR BASED ON RESULT OF COMPARISON — S14

CONTROL OF A BASE STATION

MEASURING RECEPTION SIR OF A SPECTRUM SPREAD SIGNAL TRANSMITTED FROM A MOBILE STATION — S1

COMPARISON OF RECEPTION SIR AND TARGET SIR — S2

SETTING A TRANSMISSION POWER CONTROL BIT BASED ON RESULT OF COMPARISON — S3

SAMPLING OF A TRANSMISSION POWER CONTROL BIT — S4

CONTROL OF TRANSMISSION POWER BASED ON A TRANSMISSION POWER CONTROL BIT — S5

RETURN

MEASURED NUMBER OF FRAME AFTER
SITE VERSITY SYNTHESIZATION = N_{frame}
}
→ MEASURED SYNTHESIZED FRAME ERROR RATE
= N_{error}/N_{frame}

MEASURED NUMBER OF FRAME ERROR AFTER
SITE DIVERSITY SYNTHESIZATION = N_{error}

FIG.7A

TARGET SYNTHESIZED FRAME ERROR RATE = T_{error}/N_{frame}

(1) $N_{error} \geqq T_{error}$, → T_{BS} IS INCREASED BY Δ_{UP}
(2) $N_{error} < T_{error}$, → T_{BS} IS DECREASED BY Δ_{down}

FIG.7B

N_{error}

T_{error}

DECREASE BY Δ_{down}

INCREASE BY Δ_{UP}

FIG.7C

UPPER LIMIT TARGET SYNTHESIZED FRAME ERROR RATE
$$= T_{error,u}/N_{frame}$$

LOWER LIMIT TARGET SYNTHESIZED FRAME ERROR RATE
$$= T_{error,d}/N_{frame}$$

$(T_{error,d} \leqq T_{error,u})$

(1) $T_{error} > T_{error,u} \rightarrow T_{BS}$ IS INCREASED BY Δ_{UP}

(2) $T_{error,d} \leqq N_{error} \leqq T_{error,u} \rightarrow T_{BS}$ IS NOT ALTERED

(3) $N_{error} < T_{error,d} \rightarrow T_{BS}$ IS DECREASED BY Δ_{DOWN}

FIG.8A

N_{error}

$T_{error,u}$ — DECREASE BY Δ_{down}

+/-0

$T_{error,d}$ — INCREASE BY Δ_{UP}

FIG.8B

FIG.9A

UPPER LIMIT TARGET SYNTHESIZED FRAME ERROR RATE = $T_{error,u(1)}/N_{frame}$
LOWER LIMIT TARGET SYNTHESIZED FRAME ERROR RATE = $T_{error,d(1)}/N_{frame}$

$(T_{error,d(1)} \leqq T_{error,u(1)})$

THRESHOLD VALUES $T_{error,u(n)}$ $(2 \leqq n \leqq N)$, $T_{error,d(m)}$ $(2 \leqq m \leqq M)$
$(T_{error,d(M)} \leqq T_{error,d(M-1)} \leqq \cdots \leqq T_{error,d(1)} \leqq T_{error,u(1)} \leqq$
$T_{error,u(2)} \leqq \cdots \leqq T_{error,u(N)}$) ARE SET

(1) $N_{error} > T_{error,u(N)}$ → T_{BS} IS INCREASED BY $\Delta_{up(N)}$
(2) $T_{error,u(n+1)} \geqq N_{error} > T_{error,u(n)}$ → T_{BS} IS INCREASED BY $\Delta_{up(n)}$ (n = 1~N-1)
(3) $T_{error,d(1)} \leqq N_{error} \leqq T_{error,u(1)}$ → T_{BS} IS NOT ALTERED
(4) $T_{error,d(m+1)} \leqq N_{error} < T_{error,d(m)}$ → T_{BS} IS DECREASED BY $\Delta_{down(m)}$ (m = 1~M-1)
(5) $N_{error} < T_{error,d(M)}$, → T_{BS} IS DECREASED BY $\Delta_{down(M)}$

FIG.9B

N_{error}	
$T_{error,u(N)}$	
$T_{error,u(3)}$	DECREASE BY $\Delta_{down(M)}$
$T_{error,u(2)}$	DECREASE BY $\Delta_{down(2)}$
$T_{error,u(1)}$	DECREASE BY $\Delta_{down(1)}$
$T_{error,d(1)}$	+/- 0dB
$T_{error,d(2)}$	INCREASE BY $\Delta_{up(1)}$
$T_{error,d(3)}$	INCREASE BY $\Delta_{up(2)}$
$T_{error,d(M)}$	INCREASE BY $\Delta_{up(N)}$